

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (original) A high-strength hot-rolled steel sheet excellent in hole expandability, and ductility, containing in terms of a mass%:

C: 0.01 to 0.09%,

Si: 0.05 to 1.5%,

Mn: 0.5 to 3.2%,

Al: 0.003 to 1.5%,

P: 0.03% or below,

S: 0.005% or below,

Ti: 0.10 to 0.25%,

Nb: 0.01 to 0.05%, and

the balance consisting of iron and unavoidable impurities;

satisfying all of the following formulas <1> to <3>:

$$0.9 \leq 48/12 \times C/Ti < 1.7 \quad . . . <1>$$

$$50,227 \times C - 4,479 \times Mn > -9,860 \quad . . . <2>$$

$$811 \times C + 135 \times Mn + 602 \times Ti + 794 \times Nb > 465 \quad . . . <3>, \text{ and}$$

having strength of at least 980 N/mm².

2. (original) A high-strength hot-rolled steel sheet excellent in hole expandability and ductility, containing in terms of a mass%:

C: 0.01 to 0.09%,

Si: 0.05 to 1.5%,

Mn: 0.5 to 3.2%,

Al: 0.003 to 1.5%,

P: 0.03% or below,

S: 0.005% or below,

Ti: 0.10 to 0.25%,
Nb: 0.01 to 0.05%,
at least one of
Mo: 0.05 to 0.40% and V: 0.001 to 0.10%, and
the balance consisting of iron and unavoidable
impurities;
satisfying all of the following formulas <1>' to <3>':

$$\begin{aligned} 0.9 \leq 48/12 \times C/Ti < 1.7 & \quad \dots <1>' \\ 50,227 \times C - 4,479 \times (Mn + 0.57 \times Mo + 1.08 \times V) > \\ -9,860 & \quad \dots <2>' \\ 811 \times C + 135 \times (Mn + 0.57 \times Mo + 1.08 \times V) + 602 \times Ti + \\ 794 \times Nb > 465 & \quad \dots <3>, \text{ and} \end{aligned}$$

having strength of at least 980 N/mm².

3. (currently amended) A high-strength hot-rolled steel sheet excellent in hole expandability and ductility according to claim 1 ~~or 2~~, which further contains, in terms of mass%, 0.0005 to 0.01% of at least one of Ca, Zr and REM.

4. (currently amended) A high-strength hot-rolled steel sheet excellent in hole expandability and ductility according to ~~any of claims 1 through 3~~ claim 1, which further contains, in terms of mass%, 0.0005 to 0.01% of Mg.

5. (currently amended) A high-strength hot-rolled steel sheet excellent in hole expandability and ductility according to ~~any of claims 1 through 4~~ claim 1, which further contains, in terms of mass%, at least one of:

Cu: 0.1 to 1.5% and

Ni: 0.1 to 1.0%.

6. (currently amended) A production method of a high strength hot rolled steel sheet excellent in hole expandability and ductility according to ~~any of claims 1 through 5~~ claim 1, comprising the steps of:

finishing hot rolling by setting a rolling end temperature to from an Ar₃ transformation point to 950°C;
cooling a hot rolled steel sheet to 650 to 800°C at a cooling rate of at least 20°C/sec;

air cooling then the steel sheet for 0.5 to 15 seconds;

further cooling the steel sheet to 300 to 600°C at a cooling rate of at least 20°C/sec; and coiling the steel sheet.